

REMARKS

Claims 1, 3-5, 8, 10-12, 14 and 21-28 are pending. By this Amendment claims 2, 6-7, 9, 13 and 15-20 are cancelled without prejudice to or disclaimer of their subject matter, and claims 21-28 are added. By this Amendment dependent claims 8 and 10-11 are presented in independent form, and claims 1, 3 and 14 are amended.

A. The Office Action rejects claim 1 under 35 U.S.C. §102(b) as being anticipated by Cuomo et al. If applicable to the present claim 1, this rejection is respectfully traversed.

Cuomo et al. does not disclose a gas plasma emission source that includes:

a tube disposed through the resonant cavity, the tube enclosing
a sample under test;

and where a solid state power source is coupled through a coaxial cable to a resonant cavity to excite resonant oscillations

the resonant oscillations exciting a plasma in the sample under
test, the plasma constituting a fluctuating load on the solid state
power source

as specified in claim 1.

The Applicant notes that on page 3, the Office Action asserts with respect to the rejection of claims 2-20 that Efthimion discloses that “the plasma constitutes a fluctuation load with respect to the fluctuating load (column 6, lines 64-67, pressure fluctuation in plasma creates a fluctuation impedance in the plasma source (i.e., load), adding the absorbant reduces the pressure fluctuations, thus reducing the load fluctuations).” In the cited section, Efthimion describes using an absorbant in a gas line to eliminate fluctuations in the pressure of the purge gas used in the Efthimion device.

First, the Office Action asserts without evidence that “pressure fluctuation in plasma creates a fluctuation impedance in the plasma source (i.e., load).” Although the present application discloses this, the applied art does not.

Second, the Office Action seems to equate pressure fluctuations in a purge gas with load fluctuations. As presently amended, claim 1 specifies “the plasma constituting a

fluctuating load on the solid state power source.” Neither Cuomo et al. nor Efthimion disclose this feature of claim 1.

Withdrawal of the rejection of claim 1 is respectfully solicited.

B. The Office Action rejects claims 2-20 under 35 U.S.C. §103(a) as being unpatentable over Efthimion in view of Cuomo et al. Claims 2, 6-7, 9, 13 and 15-20 have been cancelled without prejudice to or disclaimer of their subject matter. If applicable to claims 3 and 14 as amended or if applicable to claims 8 and 10-11 as presented in independent form or any claims dependent thereon, this rejection is respectfully traversed.

With respect to claim 3 and all claims dependent thereon, Efthimion in view of Cuomo et al. does not disclose, teach or suggest a gas plasma emission source that includes a resonant cavity and a tube disposed through the resonant cavity,

the tube being configured so that a sample under test enters one end of the tube, passes through the resonant cavity and exits an open end of the tube,

as specified in amended claim 3 and therefore contained in all claims dependent on claim 3.

With respect to claim 8, Efthimion in view of Cuomo et al. also does not disclose, teach or suggest an atomic emission detector that includes a spectrographic detector and a resonant cavity with a tube disposed along an axis, wherein:

the gas enters the tube from one end of the tube, another end of the tube being an open end

and

the spectrographic detector is disposed to sense atomic emissions emitted from the open end

as specified in claim 8.

With respect to claim 14, Efthimion in view of Cuomo et al. further does not disclose, teach or suggest a method of sustaining a plasma that includes

directly observing the plasma with a spectrographic detector having an unobstructed view of atomic emissions from the

plasma through an open end of a tube passing through the
resonant cavity

as specified in method claim 14.

Thus, Efthimion in view of Cuomo et al. does not render obvious the inventions specified by claim 3, 8 and 14 and all claims dependent thereon. Instead, Efthimion discloses that pump 48 pulls a gas stream 50 through quartz tube 42 disposed in cavity 12. The closed path drawing of a purge gas through tube 42 that is disclosed in Efthimion makes it impossible:

1. for the gas to “exit an open end of the tube” as specified in claim 3, or
2. for the spectrographic detector “to sense atomic emissions emitted from the open end” as specified in claim 8, or
3. to “directly observ[e] the plasma with a spectrographic detector having an unobstructed view of atomic emissions from the plasma through an open end of a tube” as specified in claim 14.

With respect to claims 4 and 11 and all claims dependent thereon, Efthimion in view of Cuomo et al. does not disclose, teach or suggest a gas plasma emission source or an atomic emission detector that includes a solid state power source coupled to a resonant cavity to sustain a plasma, wherein:

the plasma constitutes a fluctuating load on the solid state
power source

and

the power level is substantially stable with respect to the
fluctuating load

as specified in claims 4 and 11 and contained in all claims dependent thereon. The Office Action makes assertions unsupported by evidence that pressure fluctuations result in a fluctuating load on the solid state power source.

With respect to claim 10, Efthimion in view of Cuomo et al. does not disclose, teach or suggest an atomic emission detector that includes a tube extending through a resonant

cavity where “the tube comprises one of a fused silica tube and a sapphire tube” as specified in claim 10. This feature provides distinct advantage over the quartz tube disclosed in Efthimion. As discussed in the pending application, a plasma environment is a corrosive environment. Tubes as described with respect to the invention are prone to erode or oblate over time. The present invention provide distinct advantage over Efthimion. For example, the use of either a fused silica tube or a sapphire tube will extend the lifetime of the tube in this corrosive environment and a lower the cost of both tube replacement and the general cost of maintenance. Efthimion fails to recongnize these advantage. Absent recognition of these advantages, there is no motivation to modify the structure to achieve the claimed invention.

Furthermore, the Office Action fails to establish a *prima facie* case of obviousness of independent claims 3, 4, 8, 10, 11 and 14 at least because it fails to cite factual evidence of limitations specified in the claims. Assertions in Office Actions, for example that fluctuation in pressure causes a fluctuating electrical load, are unsupported by evidence of such limitations, and thus, are merely a subjective belief of unknown authority.

Even if, *arguendo*, the references applied included evidence to support an eclectic mix of limitations, the evidence is still insufficient to establish a *prima facie* case of obviousness at least because the features specified in the present claims would render the Efthimion device unsatisfactory for its intended purpose. In particular, if the device of Efthimion were to be modified to have an open end of tube 42, the purge gas could no longer be drawn through tube 42 to pump 48 and there would be no way to draw a sample carried on a purge gas through the tube 42. Efthimion uses a closed system. “If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).” See M.P.E.P., section 2143.01, page 2100-99, Rev. 1, Feb. 2000, 7th Ed.

In contrast, embodiments of the present invention has an open end of the tube. Such open end enable an observer to directly observe the plasma without any tube wall in between. Such direct observation would be impossible using a closed pump system as described in Efthimion.

CONCLUSION

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In view of the present remarks, withdrawal of the rejection of claims 1, 3-5, 8, 10-12, 14 is earnestly solicited. It is respectfully submitted that the present application is in condition for allowance. Prompt reconsideration and allowance of the application are earnestly solicited. Should the examiner believe that any further action is necessary to place the application in condition for allowance, the examiner is invited to contact the undersigned applicant representative at the telephone number listed below.

The Commissioner is hereby authorized to charge any fees (or credit any overpayment) associated with this communication to Deposit Account No. 50-1078.

Respectfully submitted,

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